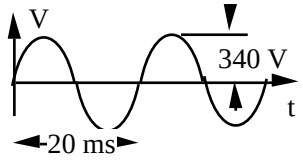
Electrical power and safety

Notes from Joe Wolfe, UNSW

2 cables from substation/transformer carry 240 V_{ac}



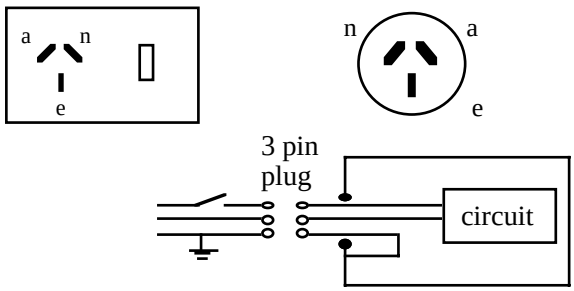
gives same power as 240 V_{DC}.

Earthing

'live' at 240 V with respect to earth

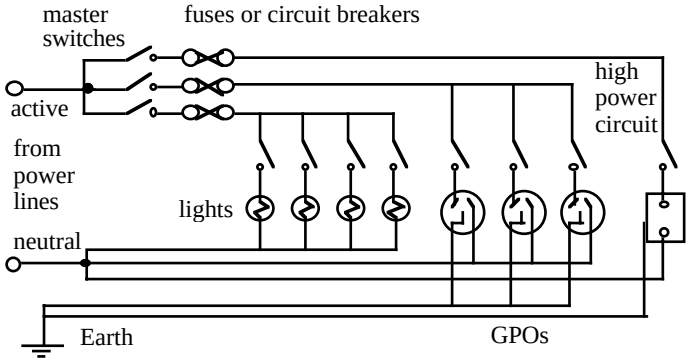
'neutral' is return to substation—near 0 V

'earth' connects to earth near building (eg via water pipes)



Metal case connected to earth via low R pathway

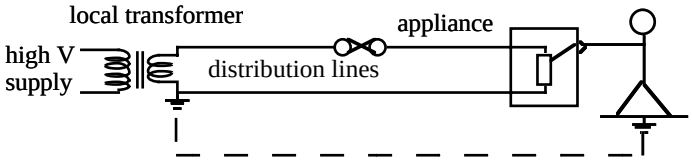
Domestic circuit



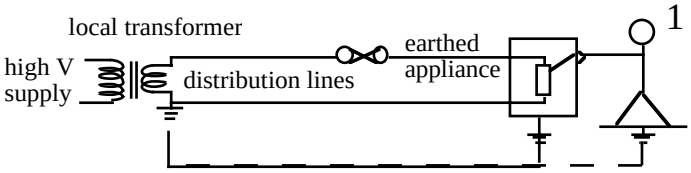
Note that switches are in the active line. Note that master switches should be off before changing fuses.

Earth connected to the earth—e.g. via water pipes.

Electrocution often occurs via the floor/chair etc.(wet floors, baths dangerous)



Earthed case provides low R return path and blows fuse, or ***preferably an earth leakage detector.*** (ELD turns off very quickly and reduces danger.)



- Earth leakage detector detects quite small currents to earth and ***turns of the supply very quickly*** - *may prevent electrocution.*
- One hand safer than two.
- Back of hand safer than the front.
- Dry rubber soled shoes safer.
- Even small shocks can be dangerous to a person on a ladder
- power saws and electric mowers may cut their own cable
- water is a conductor

Clinical precautions

Dry skin is not a very good conductor, but people with electrodes attached to them, or metal catheters in their veins, or salty gels or bathing solution: have a low R pathway to their tissue and so are vulnerable. Even static electric charges might be dangerous to them.